

CAAP Quarterly Report

Date of Report: Jan. 19th, 2017

Contract Number: DTPH56-16-H-CAAP03

Prepared for: U.S. DOT Pipeline and Hazardous Materials Safety Administration

Project Title: Development of New Multifunctional Composite Coatings for Preventing and Mitigating Internal Pipeline Corrosion

Prepared by: North Dakota State University

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For quarterly period ending: Dec. 31, 2016

Business and Activity Section

(a) Generated Commitments

No changes to the existing agreement

No purchase made over this reporting period

Kickoff meeting was held at North Dakota State University on Dec. 6th 2016.

(b) Status Update of Past Quarter Activities

The research activities in the first quarter consist of kick-off meeting and related corresponding literature review in Task 1 and some preliminary work preparing for work at Task 2, as summarized below.

Task 1: Literature review and kick off meeting

Task 1.1 Kick-off meeting

A kick-off meeting with the USDOT personnel was held at North Dakota State University on Dec. 6th, 2016. The PHMSA program manager, Dr. James Merritt, had a one-day NDSU campus visit for kick-off meeting. The meeting agenda and major activities are shown in Table 1, including meeting with PIs and the students, and meeting with Dean of College of Engineering and department chair of Civil Engineering, and tours to laboratory and facilities at NDSU (see Fig. 1). The understandings from this task are expected to lead to our proposed concept and a systematic study will be then addressed in Tasks 2 through 7.

Table 1 Kick-off meeting agenda (Tuesday, Dec. 6th, 2016)

Items	Major Contents	Note
Location	College of Engineering, Dept. of Civil Engineering, Dept. of Coatings and Polymeric Materials, NDSU, Fargo, ND.	
Objectives	a. Major framework, funding activities and expectation of the PHMSA	* PIs appreciate the mission of the

	<p>b. A big picture of this project and related to work and expectation* of the PHMSA</p> <p>c. Introduction and discussion of the project, objectives and tasks</p> <p>d. Meeting with NDSU personnel (PIs and students, Dean of College of Engineering, Department chair of Civil Engineering) for current projects and potential future collaboration</p> <p>e. Visit NDSU facilities, labs and facilities associated with the projects and future collaborative work</p>	PHMSA on particularly desirable high expectation of student involvement in the project.
Detailed schedules and activities	<p>8:30 AM Hotel Pick up, by Dr. Zhibin Lin</p> <p>8:45 – 10:00 AM, Kick off meeting (Dean’s conference room 201)</p> <ul style="list-style-type: none"> ○ Dr. James Meritt gave a big picture of the PHMSA and the activities. ○ Dr. James Meritt discussed with PIs about the expectation of the project and particularly talked to the two PhD students involved in this project, Xingyu Wang and Mingli Li, for their roles in this project and high expectation to them for involvements in the field of pipeline. ○ Dr. Zhibin Lin gave a presentation about the current research topics related to pipeline (corrosion mechanism, pipeline health monitoring and corrosion mitigation), and then addressed the background of this project and tasks. <p>10:00 – 10:30 AM, Meeting with Dean Dr. Gary Smith (Dean’s office)</p> <p>10:30 – 11:00 AM, Meeting with CEE Chair Dr. Dinesh Katti (Chair’s office)</p> <p>11:00 – 12:00 AM, Lab tour</p> <ul style="list-style-type: none"> ○ Dr. James Meritt visited the laboratory in the Dept. of Coatings and Polymeric Materials and Dr. Dante’s lab (Fig. 1). ○ Dr. James Meritt also visited the laboratories in the research one center at NDSU (Fig. 1). <p>12:00 AM – 1:30 PM, Lunch (Applebee’s Restaurant, 19TH street)</p> <p>1:45– 3:20 PM, Meet with Dr. Ying Huang and her group</p> <p>3:30 PM, Drop off to Airport, by Dr. Zhibin Lin</p>	** College Dean and Department Chair appreciate the financial support for PI and one student to attend the coming API conference.

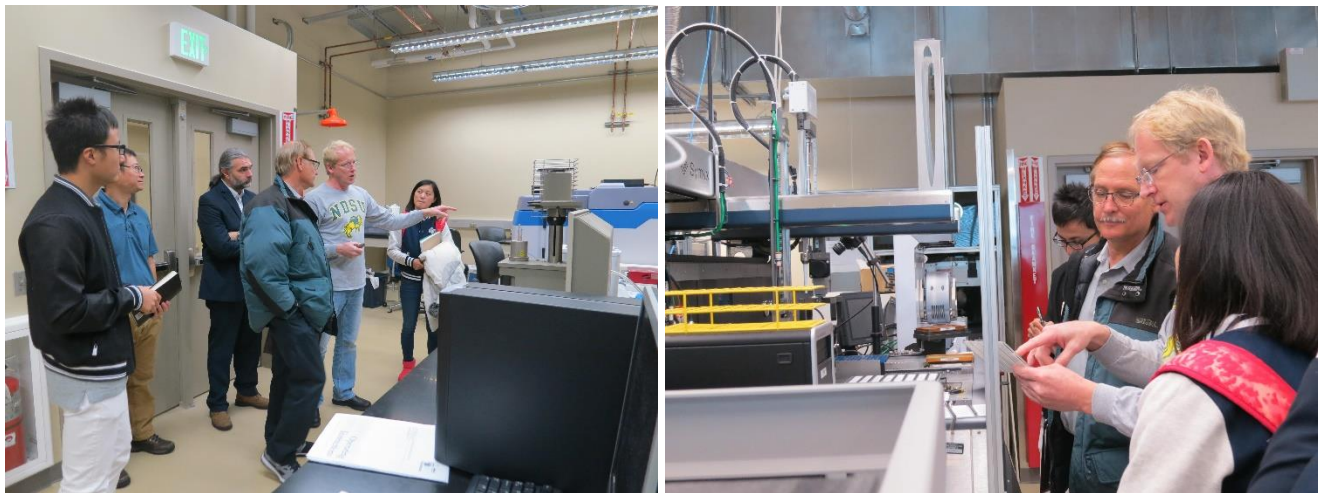


Fig. 1 PHMSA project manager, Dr. James Merritt, visited the laboratories at NDSU with the PIs and two PhD students.

Task 1.2 Literature review

A literature review covers most of the USDOT and pipeline industrial project reports, transportation agency and research publications, various studies for pipeline corrosion mitigation and prevention. The protective coatings for internal corrosion control have a wide variety of types, including single or dual

layer fusion bonded epoxy coatings (FBE), coal tar, asphalt enamels, Epoxy Resin lining, Polyurethane/Polypropylene (PE/PP) lining, and other fiber reinforced polymer (FRP) linings. Besides that, more new high-performance coatings have been developed in recent years. In the review, particular attentions are also paid on advanced high-performance coatings, including types of durability, ease in installation, and applicability. Clearly, although high performance anti-corrosion coatings offer promising opportunities, the integration of high performance anti-corrosion coatings into oil and gas pipelines applications still face several challenges. Thus, the information is an essential step toward the effectiveness and functionality of the proposed coating for pipeline corrosion monitoring.

(c) Description of any Problems/Challenges

No problems are experienced during this report period

(d) Planned Activities for the Next Quarter

The planned activities for next quarter are listed below:

- Screen polymers for primer materials and synthesize the nano-modified coatings
- Characterize and optimize the new coatings